IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of	:	Phyllis Leithem et al.
Serial No.	:	09/334,125
Filed	:	June 15, 1999
Title	:	ABSORBENT PRODUCTS AND METHODS OF PREPARATION THEREOF
Group Art Unit	:	3761
Examiner	:	Dennis Ruhl

CERTIFICATE OF EXPRESS MAILING

I hereby certify that this correspondence, and Exhibits A-G attached hereto, is being deposited with the United States Postal Service as Express Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on

Date: August 27, 2001

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Name: Maria Caamaño

Signature: [signature]

Assistant Commissioner For Patents
Washington, D.C. 20231

37 CFR § 1.607(a)
REQUEST BY APPLICANTS FOR INTERFERENCE WITH PATENT

S I R:

Applicants seek an interference between the present application and an unexpired patent. The claims to be placed in interference are directed to methods of making a personal hygiene article with an absorbent core comprising specially treated wood fiber. In general, the invention relates to the discovery that it is advantageous to make the absorbent core of a personal hygiene article from wood fiber that is treated with a pH basic solution at relatively low temperatures and fluffed. Applicants disclosed this invention in the grandparent of the present application, which was filed in January of 1994. The inventors of the issued patent filed their application a year and a half later, in July of 1995. Applicants respectfully request that an interference be declared and that applicants be declared the senior party.

This request for interference is related to a request for interference filed by applicants in Serial No. 09/863,585, which is a continuation of the present application.

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The requirements of 37 CFR § 1.607(a) are satisfied as follows:

I. 37 CFR § 1.607(a)(1)

Applicants seek the declaration of an interference between the present application ("Leithem '125 application") and U.S. Patent 5,766,159 to Martin et al. ("Martin '159 patent"). A copy of the Martin '159 patent is attached as "Exhibit A".

II. 37 CFR § 1.607(a)(2)

Applicants present the following Proposed Count 1:

Claim 1 of the Martin '159 patent

OR

Claim 61 of the Leithem '125 application.

Proposed Count 1 is a bifurcated count that includes as count alternatives the respective independent claims of the Martin '159 patent and the present application. For the convenience of the Examiner, a proposed form PTO-850 is attached as "Exhibit B". For the Examiner's convenience in filling out form PTO-850, a copy of Proposed Count 1 with a recital of the two alternative count claims is attached as "Exhibit C". A claim chart showing the correspondence between claim 1 of the Martin '159 patent and claim 61 of the Leithem '125 application is attached as "Exhibit D". As shown in Exhibit D, an interference is needed to resolve the priority of invention.

III. 37 CFR § 1.607(a)(3)

Claims 1-6 of the Martin '159 patent are identified as corresponding to Proposed Count 1. These are all of the claims of the Martin '159 patent.

IV. 37 CFR § 1.607(a)(4)

Claims 61 and 62 of the present application (the Leithem '125 application) are identified as corresponding to Proposed Count 1. These are the only claims now pending in the present application. A clean copy of these claims is attached as "Exhibit F".

A. Claims 1-6 of the Martin '159 Patent
Correspond to Proposed Count 1

Claim 1 of the Martin '159 patent corresponds exactly to Proposed Count 1. Claims 2-6 of the Martin '159 patent also correspond to Proposed Count 1 because: a) those claims depend from claim 1 of the Martin '159 patent, and b) the additional limitations defined by claims 2-6 do not make those claims separately patentable. In this regard, it is noted that claim 4 of the Martin '159 patent limits the strike-through acquisition re-wet weight of the sublayer material to "less than about 40 grams." This is not a patentable distinction because the Martin '159 patent reports that even untreated pulp had a re-wet weight of "38.0" grams. Martin '159 patent, Table 3, col. 9, line 53. Also, it is noted that claim 5 of the Martin '159 patent limits the pre-poured saturated drainage (PSD) capacity of the sublayer material to "greater than about 400 ml." This is not a patentable distinction because the Martin '159 patent reports that a PSD of "430 ml" was achieved even when the pulp was not treated with any base at all. Martin '159 patent, Table 1, col. 8, line 54.

B. Claims 61 and 62 of the Leithem '125
Application Correspond to Proposed Count 1

Claim 61 of the Leithem '125 application corresponds exactly to Proposed Count 1. Claim 62 of the Leithem '125 application also corresponds to Proposed Count 1 because it depends from claim 61 and the additional limitations defined by claim 62 do not make that claim separately patentable.

V. 37 CFR § 1.607(a)(5)

The terms of the claims of the present application that are identified as corresponding to Proposed Count 1 (claims 61 and 62 of the Leithem '125 application) are applied to the disclosure of the present application as follows:

Claim 61 Leithem '125 Application	Application of the Terms of the Claim to the Specification of the Leithem '125 Application
A method for making an absorbent composite useful for personal hygiene articles which comprises:	p. 1 ("use of modified pulps for absorbent products of household and hygienic uses such as diapers, incontinence and catamenial devices"); p. 7 ("While the above illustration has been for a diaper, other devices have been constructed in a similar manner.")
treating a wood fiber pulp containing wood fibers with a base	p. 5 ("Upon a cold caustic treatment of the pulp/fibers, these show improved properties."); p. 6 ("the improved properties are obtained regardless of the wood species which have been employed")
at a temperature ranging from 15° C. to about 60°C.	p. 4 "[b]y the term 'cold' it is meant a caustic treatment not to exceed 60°C but desirably at a temperature less than 50°C but preferably at a temperature between 15°C to 50°C"); application claim 1 ("treating a pulp at a temperature of up to about 60°C, in a suspension, with an alkali solution")
thereby forming a treated wood fiber pulp containing wood fibers;	p. 4 ("cold alkali extraction (CAE) of pulps such as preferably obtained from coniferous and deciduous trees result in fibers that have advantageously and unexpectedly improved absorption properties")
fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;	p. 14 ("converted by the end-user from the dried, sheeted pulp to a pad of 'fluffed' fibers by mechanical action"); p. 1 ("to produce cellulosic pulps having altered and novel fiber properties desirable for end-use applications for absorbent and fluff pulp products")
providing at least one fluid permeable topsheet layer	p. 2 ("[a]n 'acquisition' layer of proper characteristics and properties allows the liquid to pass quickly into the absorbent core"); or Figure 2, Item 11 (p. 6, "Item 11 is a thermally-bonded polypropylene coversheet, it is typically carded or spun.")
and at least one substantially fluid impermeable backsheet layer; and	p. 7 ("The water barrier, which is a polyethylene sheet has been shown as 16.")
interposing the sublayer material between the topsheet layer and the backsheet layer.	Figure 2 (see, item 14 interposed between items 11, 12 and 16); p. 6 ("Item 12 is an airlaid cellulose acquisition layer."); p. 7 ("the absorbent core is identified as 14"); p. 7 ("The water barrier, which is a polyethylene sheet has been shown as 16.")

Claim 62 Leithem '125 Application	Application of the Terms of the Claim to the Specification of the Leithem '125 Application
The method of claim 61	(see above)
wherein the sublayer material contains from about 25 to about 100% by weight of treated cellulosic fiber pulp and from about 0 to about 75% by weight of unprocessed fibers.	p. 7 ("the modified pulps may be 100% of the improved pulps as constituent pulps in the product or may be used in the product in lesser quantities, i.e., used in various admixtures with other pulp, from about 100% to about 25%")

VI. 37 CFR § 1.607(a)(6)

37 CFR § 1.607(a)(6) is satisfied because, prior to the expiration of the one year period following the issue of the Martin '159 patent, at least one of the claims of the present application was for "substantially the same subject matter" as at least one claim of the Martin '159 patent. In particular, the Martin '159 patent issued on June 16, 1998 and claim 61 of the Leithem '125 application was added in a Preliminary Amendment filed on June 15, 1999. Claim 61 of the Leithem '125 application, as presented in that Preliminary Amendment, is compared to claim 1 of the Martin '159 patent in "Exhibit G". As shown in Exhibit G, the claim 61 that was presented in the June 15, 1999 Preliminary Amendment contains all of the material limitations of claim 1 of the Martin '159 patent.

VII. Request For The Benefit Of The Filing Dates Of Applicants' Priority Applications

Applicants claim priority under 35 U.S.C. § 120 based on U.S.S.N. 08/370,571 ("Leithem '571 application"), filed January 18, 1995, and U.S.S.N. 08/184,377 ("Leithem '377 application"), filed January 21, 1994, now abandoned.

Because the present application shares the same specification as the Leithem '571 application, claims 61 and 62 of the present application are also supported by the Leithem '571 application (see, Section V, supra). Thus, if an interference is declared based on Proposed Count 1, applicants will be entitled to at least the January 18, 1995 filing date of the Leithem

'571 application. Because this date is before the July 6, 1995 filing date of the Martin '159 patent, applicants should be declared the senior party.

Applicants are also entitled to the January 21, 1994 filing date of the Leithem '377 application because claim 61 of the Leithem '125 application (which is included in Proposed Count 1) reads on at least one embodiment disclosed in the Leithem '377 application:

Claim 61 Leithem '125 Application	Embodiment of the Terms of the Claim In the Specification of the Leithem '377 Application
A method for making an absorbent composite useful for personal hygiene articles which comprises:	p. 1 ("use of modified pulps for absorbent products of household and hygienic uses such as diapers, incontinence and catamenial devices"); p. 7 ("While the above illustration has been for a diaper, other devices have been constructed in a similar manner.")
treating a wood fiber pulp containing wood fibers with a base	p. 5 ("Upon a cold caustic treatment of the pulp/fibers, these show improved properties."); p. 6 ("the improved properties are obtained regardless of the wood species which have been employed")
at a temperature ranging from 15° C. to about 60° C.	p 14 "[b]y 'cold caustic extraction' (CCE) is meant the treatment of pulp at a temperature less than 40°C, preferably about 30°C")
thereby forming a treated wood fiber pulp containing wood fibers;	p. 4 ("cold caustic extraction (CCE) of pulps such as preferably obtained from coniferous and deciduous trees result in fibers that have advantageously and unexpectedly improved absorption properties")
fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;	p. 15 ("cold caustic treatment . . . is novel with respect to . . . absorbent core materials"); p. 26 ("[t]he absorbent core is a mixture of cellulose fiber, fluffed and air laid")
providing at least one fluid permeable topsheet layer	p. 2 ("[a]n 'acquisition' layer of proper characteristics and properties allows the liquid to pass quickly into the absorbent core"); or Figure 2, Item 11 (p. 7, "Item 11 is a thermally-bonded polypropylene coversheet, it is typically carded or spun.")
and at least one substantially fluid impermeable backsheet layer; and	p. 7 ("The water barrier, which is a polyethylene sheet has been shown as 16.")
interposing the sublayer material between the topsheet layer and the backsheet layer.	Figure 2 (see, item 14 interposed between items 11, 12 and 16); p. 7 ("Item 12 is an airlaid cellulose acquisition layer."); p. 7 ("the absorbent core is identified as 14"); p. 7 ("The water barrier, which is a polyethylene sheet has been shown as 16.")

VIII. 37 CFR § 1.608

37 CFR § 1.608 is not applicable because the effective filing date of the present application (which is at least as early as the January 18, 1995 filing date of the Leithem '571 application) precedes the July 6, 1995 filing date of the application that issued as the Martin '159 patent.

IX. Proposed Form PTO-850

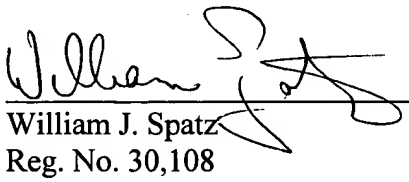
For the convenience of the Examiner, a proposed form PTO-850 is attached as "Exhibit B".

* * *

Should any questions arise, the Examiner is invited to telephone the attorneys for applicants at 212-715-9257 (William J. Spatz, Reg. No. 30,108) or 212-715-9472 (Louis H. Weinstein, Reg. No. 45,205).

Respectfully submitted,

KRAMER LEVIN NAFTALIS & FRANKEL LLP

By: 

William J. Spatz
Reg. No. 30,108
Louis H. Weinstein
Reg. No. 45,205

August 27, 2001

EXHIBIT A

US005766159A

United States Patent [19]

Martin et al.

[11] Patent Number: 5,766,159

[45] Date of Patent: Jun. 16, 1998

[54] **PERSONAL HYGIENE ARTICLES FOR ABSORBING FLUIDS**

[75] Inventors: **Bruce D. Martin**, DeRidder, La.; **Thomas L. Wiesemann**; **John D. Shoemaker, Jr.**, both of Mobile, Ala.

[73] Assignee: **International Paper Company**, Purchase, N.Y.; by said Thomas L. Wiesemann and John J. Shoemaker, Jr.

[21] Appl. No.: 499,115

[22] Filed: Jul. 6, 1995

[51] Int. Cl.[6] A61F 13/15; A61F 13/20

[52] U.S. Cl. 604/368; 264/257; 604/375

[58] Field of Search 604/368, 365, 604/375, 370, 378, 366, 367, 369, 374; 264/5, 239, 256, 257

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[57] **ABSTRACT**

A personal hygiene article having an increased capacity for absorbing fluids is disclosed. The article contains a surface layer containing at least one fluid permeable material and a sublayer containing at least about 10 wt. % of a fluffed wood pulp for retaining fluids. Articles of the invention have improved absorbance properties under re-wet conditions even in the absence of organic cross-linking agents or fiber modifiers.

6 Claims, No Drawings

Exhibit A to Request For Interference in 09/334,125

PERSONAL HYGIENE ARTICLES FOR ABSORBING FLUIDS

FIELD OF THE INVENTION

This invention relates to personal hygiene articles for absorbing fluids, and more particularly to personal hygiene articles containing low cost highly absorbent materials.

BACKGROUND OF THE INVENTION

Personal hygiene articles which are designed to absorb fluids, particularly body fluids such as blood, urine, pus and the like, include items such as tampons, sanitary napkins, diapers, bibs, incontinence pads, surgical sponges, compresses, bandages, and wipes. An important component of these articles is the absorbent material, generally known as fluff, which may be made from cellulosic fibers or synthetic fibers or a combination of cellulosic and synthetic fibers. As used in these articles, fluff is intended to provide one of two functions, to wick fluid away from the surface of the article and transport the fluid to an internal location within the product away from the surface of the article or to absorb and retain an amount of fluid so that the surface of the article remains dry. Fibers may be formed with different properties depending on which of the two functions is more desirable. Cellulosic fibers may be used as fluff in these articles because they are relatively inexpensive and are typically inert to human body chemistry, thus they do not create any unwanted side effects associated with their use.

It has long been a goal of the fiber processing industry, and the industries which they supply, to develop improved fiber structures that can transport and retain an increased amount of fluid at a higher rate of absorbency. Additionally, the ability to handle several repeated instances of fluid wetting and transport is seen as greatly desirable for many personal hygiene products, as exemplified by a diaper intended for overnight use.

The most desirable fibers for use as fluff in disposable personal hygiene articles are cellulosic fibers of wood prepared according to conventional techniques. Such fibers are readily available and are low cost. Unfortunately, commercially available cellulosic fibers have a tendency to bond together as they dry after an initial wetting. Bonding of the fibers causes the fluff to clump into a mass that is no longer able to absorb and transport liquid in the amount or at the rate observed during the first wetting. Accordingly, the performance of known cellulosic fibers is less than optimal for the personal hygiene articles made containing such fibers.

In response to this problem, various modifications of the fibers have been devised which are intended to enhance the multiple wetting transport properties of the fluff in personal hygiene articles. Unfortunately, these modifications tend to have significant deficiencies, not the least of which is the increased cost of manufacturing. Additionally, fibers treated with organic compounds to improve their transport properties may give off formaldehyde or other residues of the organic cross-linking agents or catalysts which cannot be completely removed from the fibers. Thus, personal hygiene articles containing organically treated fibers may release unpleasant odors or they may increase the amount of skin irritation associated with the articles. Furthermore, the extreme process conditions and length of time required for treating the fibers are significant deficiencies of the currently used methods for increasing the fluid transport properties of cellulosic fibers.

Thus, there is a need for personal hygiene articles containing inexpensively processed, absorbent fibers. The fibers should have fluid transport properties which remain effective to transport and retain fluids even upon repeated wetting and/or compression of the fibers. Furthermore, the fibers should be substantially free of skin irritants and/or odor releasing substances.

Accordingly, it is an object of the present invention to provide an improved personal hygiene article for absorbing fluids.

It is another object of the invention to provide an improved personal hygiene article containing a cellulosic fiber fluff having improved fluid transport properties.

It is a further object of the invention to provide an improved personal hygiene article containing a wood fiber fluff for transporting and retaining fluids in a location away from the surface of the article.

It is yet another object of the invention to provide an improved personal hygiene article wherein the fiber fluff retains its fluid transport and fluid retention properties through several wetting episodes even after compression of the fibers.

SUMMARY OF THE INVENTION

Having regard to the above and other objects and advantages, the present invention provides an improved personal hygiene article for absorbing fluids. The personal hygiene article comprises a surface layer containing at least one fluid permeable material and a sublayer adjacent the surface layer containing at least about 10 wt. % of fluffed wood pulp for retaining fluids. The sublayer may be further characterized as having a pre-poured saturated drainage (PSD) capacity greater than about 400 mL. A significant benefit of the articles of the present invention are that they have an increased capacity to absorb, transport and retain fluids even after being previously wet and compressed.

Accordingly, it has been found that wood fibers, preferably softwood fibers, having been treated with a strong base under low temperature conditions (e.g., temperatures in the range of from about 0° C. to about 80° C.) have an unexpectedly high dynamic capacity for absorbing fluids in personal hygiene articles. The base-treated wood fibers used to form the absorbent sublayer of the personal hygiene articles of the present invention have been found to retain fluids to a greater degree than do the untreated fibers. Also, the base-treated fibers, hereinafter referred to as "fluffed wood pulp" do not give off formaldehyde of other residues of organic compounds typically used for increasing the transport properties of the fibers since the fibers need not be treated with organic cross-linking agents and the like to improve their absorbency properties. Furthermore, personal hygiene articles containing a fluffed wood pulp sublayer have been found to be capable of repeated wetting and absorbing episodes without substantial binding or clumping of the fluffed wood pulp even after compression of the sublayer.

DETAILED DESCRIPTION OF THE INVENTION

Personal hygiene articles of the invention containing highly absorbent fluffed wood pulp include diapers, tampons, sanitary napkins, bibs, incontinence pads, surgical sponges, compresses, bandages, wipes, and the like. Personal hygiene articles of the foregoing type typically contain a first layer made of at least one fluid permeable material and a sublayer adjacent the first layer containing from about 10 to about 100 wt. % of fluffed wood pulp as the absorbent

layer. In a preferred form of the invention, the personal hygiene article will contain at least one fluid permeable topsheet layer, at least one fluid impervious backsheet layer coterminous with the topsheet layer and at least one absorbent sublayer between the topsheet layer and the backsheet layer, wherein the absorbent sublayer contains from about 10 up to about 100 wt. % of fluffed wood pulp having a pre-poured saturated drainage capacity greater than about 400 mL.

Both the fluid permeable material and the fluid impervious material, when used, are well known to those of ordinary skill. Accordingly, the topsheet layer may be made from a wide range of materials, such as porous foams, reticulated foams, appertured plastic films, natural fibers (e.g., wood or cotton fibers), synthetic fibers (e.g., polyester or polypropylene fibers) or from a combination of natural and synthetic fibers. Preferably, the fluid permeable material is a hydrophobic material which will effectively isolate the wearer's skin from fluids in the absorbent sublayer. The fluid permeable material in the topsheet layer may be treated with a surfactant in order to facilitate penetration of fluid through the layer, recognizing, of course, that the topsheet layer should remain relatively hydrophobic as compared to the absorbent sublayer.

In one of its embodiments, the present invention relates to a method for making a personal hygiene article. The method comprises treating a wood pulp with an amount of base at a temperature within the range of from about 0° C. to about 80° C. thereby forming a treated wood pulp having a pre-poured saturated drainage (PSD) capacity greater than about 400 mL. Next the treated wood pulp is fluffed to form a highly absorbent sublayer for use in the article. At least one surface of the sublayer is then laminated with a topsheet formed from a flexible, fluid permeable material thereby forming the personal hygiene article.

In a particularly preferred embodiment, a second surface of the sublayer is laminated with a backsheet formed from a fluid impervious material so that the absorbent sublayer is between the topsheet layer and the backsheet layer. The backsheet layer is preferably made from a thin plastic polyolefinic film that is relatively impervious to fluids. Accordingly, the backsheet layer is selected from a material which effectively prevents fluids absorbed by the absorbent sublayer from wetting articles of clothing and the like which contact the personal hygiene article. Preferably, the backsheet layer is a polyethylene film having a thickness of from about 0.012 mm to about 0.051 centimeters. However, any commercially available fluid impervious material having suitable flexibility may be used to make the backsheet layer.

Well known fluid permeable materials, fluid impervious materials and methods for assemblage of personal hygiene articles containing a topsheet layer, a backsheet layer and an absorbent layer are disclosed in U.S. Pat. No. 5,019,063, incorporated herein by reference as if fully set forth. However, in contrast to the personal hygiene articles disclosed in the foregoing and other references, the articles of the present invention contain one or more layers of highly absorbent fluffed wood pulp as the absorbent sublayer. The absorbent sublayer of the present invention may be characterized not only by its outstanding pre-poured drainage capacity of greater than about 400 mL but also by its strike-through acquisition re-wet weight of less than about 40 grams.

Accordingly, the absorbent sublayer of the personal hygiene articles of the present invention contain one or more layers of fluffed wood pulp which may or may not be separated by tissue or nonwoven materials. The absorbent sublayer may contain from about 10 up to about 100 wt. %, preferably from about 20 to about 100 wt. % of the fluffed wood pulp, and most preferably about 50 wt. % fluffed wood pulp and about 50 wt. % unprocessed fiber. Optionally, the absorbent sublayer may be composed of from about 10 to about 90 wt. % of fluffed wood pulp and from about 10 to about 90 wt. % of super-absorbing polymers in the form of grains, powders, small filaments or other forms. Super-absorbing polymers may be admixed with the fluffed wood pulp or they may be placed in a separate absorbent layer above or below the fluffed wood pulp layer to form a composite absorbent sublayer.

Unlike the materials known in the prior art, articles of the present invention containing fluffed wood pulp are capable of maintaining their excellent fluid transport properties and fluid retention characteristics even after repeated wetting and absorbing episodes. The improved fluid transport properties of the articles of the present invention may be due, at least in part, to the fact that the fibers of the fluffed wood pulp have a decreased tendency to bind or clump together upon wetting and drying, even when compressed by body weight.

The fluffed wood pulp for use in the absorbent sublayer of the articles of the present invention may be made by combining an amount of water with a cellulosic wood fiber selected from the group consisting of bleached and unbleached softwood, hardwood, and bagasse, preferably bleached softwood fiber to form a slurry. The amount of water combined with the wood fibers is that amount which is sufficient to form a slurry having a consistency in the range of from about 0.1 to about 88 wt. %, and preferably in the range of from about 8 to about 40 wt. %. Consistency is defined as the oven dry weight of the wood fibers in the slurry, divided by the total weight of the slurry.

After forming the slurry, the slurry is treated with a basic solution formed by combining NaOH, KOH, LiOH, NH_4OH, Na_2CO_3, white liquor (e.g., caustic solution containing Na_2S and Na_2CO_3), or a combination of two or more of the foregoing compounds or mixtures with an amount of polar solvent such as water. The treatment effectiveness is dependent on both the concentration of the basic solution and the temperature. At lower temperatures, weaker basic solutions may be used to achieve a similar effect. Accordingly, preferred treatment temperatures are in the range of from about 20° to about 80° C. and the concentrations of the corresponding basic solutions are preferably in the range of from about 100 to about 350 grams per liter respectively.

While the treatment of the pulp with a basic solution is relatively independent of the slurry consistency, lower consistencies may require more basic solution in order to maintain the desired base concentration. Furthermore, slurry consistencies of about 30 wt. % or higher may require more elaborate mixing techniques in order to assure adequate contact between the wood fibers in the slurry and the strong base.

Required treatment times are relatively short, although treatment of the wood fibers with the strong base may be conducted for 10 hours or more if desired. Typically, the wood fibers are treated for a period of time from about 10 seconds to about 1 hour, more preferably from about 30 seconds to about 30 minutes and most preferably from about 1 minute to about 5 minutes. During treatment, the wood fibers and strong basic solution are admixed vigorously to assure adequate contact and reaction between the fibers and the basic solution.

Treatment of the wood fibers may be conducted under atmospheric, subatmospheric or superatmospheric conditions. For ease of equipment design and operation, atmospheric conditions are most preferred.

Starting with equations defining concentration and consistency, knowing the oven dry weight of the fiber, the weight of the water in the slurry, the base concentration and slurry consistency desired, the amount of water and base to use in preparing the basic treating solution can be calculated. In order to illustrate the calculations, the following example is given. In this example, it is assumed that the basic solution for treating the fibers is made from water and solid NaOH.

EXAMPLE 1

In order to determine the desired consistency of the pulp slurry, the following equation may be used:

$$C_s=W_f/(W_f+W_{wp}+W_{wc}+W_c)$$

where

C_s=Consistency of the slurry (wt. %).

W_f=Oven dry weight of cellulosic fibers in the slurry (grams).

W_{wp}=Weight of water in the slurry (grams).

W_{wc}=Weight of water in the basic solution (grams).

W_c=Weight of base in the basic solution (grams).

In order to determine the concentration of the basic solution, the following equation may be used:

$$C_c=W_c/(W_{wp}+W_{wc})$$

where

C_c=Concentration of base in the slurry (grams/ml).

The total weight of the slurry is defined by the following equations:

$$W_p=W_{wp}+W_f$$

where

W_p=Total weight of the slurry (grams).

and

$$C_p=W_f/W_p$$

where

C_p=Consistency of the slurry (wt. %).

Solving the foregoing equations for W_{wc}, the weight of the water required, and W_c, the weight of the base in the solution, yields the following equations:

$$W_{wc}=W_p(C_p((1/C_s-1)/(C_c+1))+(C_p-1))$$

and

$$W_c=C_cW_pC_p(1/C_s-1)/(C_c+1).$$

Throughout this example, it is assumed that one milliliter of water always weighs one gram although 1 ml of basic solution weighs more than 1 g.

Treatment of the wood fibers requires a greater base concentration at higher temperatures, and so the concentration chosen for the treatment solution will depend upon the temperature at which the treatment is conducted. The following example illustrates the relationship between the base concentration and temperature useful for preparing fluffed wood pulp for use in the articles of the present invention.

EXAMPLE 2

The following strong base concentrations of NaOH correspond to treatment temperatures found to be suitable for preparing fluffed wood pulp for use in an absorbent sublayer:

Temperature, °C.	Concentration of NaOH (g/L)
22	120
48	165
64	223
74	330

Both the wood fibers and the basic solution may be brought to or cooled below the desired treatment temperature before the fibers are treated. Likewise, the basic solution may be super-cooled so that the desired treatment temperature is not exceeded when the basic solution is admixed with hot pulp. For example, for treatment of wood pulp at a temperature 74° C., a strong basic solution will typically need to be cooled to about 22° C. before admixing the strong basic solution with the pulp.

In order to terminate the treatment of the wood fibers, water may be added to the slurry in an amount sufficient to decrease the basic solution to a concentration of less than about 100 grams per liter. In the alternative, the temperature of the slurry containing the treated wood fibers and basic solution may be increased above about 80° C. in order to terminate the treatment. Any combination of water addition and temperature increase may also be used to terminate the treatment reaction.

Once treated, excess water may be drained from the mixture, and the remaining treated wood fibers may be washed one or more times with a rinse water and/or an acidic solution to further remove and/or neutralize the basic solution. The water wash should be sufficient to dilute the basic solution to below the effective treatment range, e.g. the concentration of base in the pulp should be less than about 100 grams per liter. Repeated washings with water may be required to effectively dilute the basic solution. Accordingly, the slurry of treated wood fibers may be rinsed and/or neutralized until the pH of the washings is in the range of from about 1 and to about 10, and preferably from about 3 to 9. The washings may be aided by pressing the pulp to remove excess liquid. In the alternative, the pulp may be washed with water and treated with an acid solution such as a sulfuric acid solution to reduce the total number of water washings required to decrease the base concentration in the treated wood fibers.

The fluffed wood pulp may then be recovered from the treatment slurry and dried in either sheet form or in free form. Preferably, the fibers are dried and formed such that they may be used on the equipment employed to produce the personal hygiene articles without any modification to the equipment. In an alternate embodiment, the fluffed wood pulp may be combined with unprocessed fibers to form a blend for use in the absorbent sublayer. Alternatively, treated fibers may be obtained commercially as by purchasing fluffed wood pulp from Buckeye Cellulose Corporation.

Without being bound by theory, it is believed that the fluffed wood pulp fibers are more irregularly shaped than fibers not treated with a low temperature basic solution. The untreated fibers are believed to be relatively linear and align with each other during episodes of wetting. Upon drying, untreated fibers bind to one another. However, the irregularly shaped fluffed wood pulp fibers do not align upon wetting and, thus, do not bind or clump during drying.

The wood fibers treated by the foregoing process not only have an increased fluid absorbency, but the fluffed wood pulp also has increased fluid transport properties and a

superior ability to retain these enhanced characteristics through successive wetting and drying cycles.

Fluffed wood pulp having increased absorbency and fluid transport properties may be assembled with other materials into personal hygiene articles according to the following method. A fluid permeable topsheet material may be prepared from a flexible apertured polymeric film. The topsheet material may include one or more layers of standard nonwoven materials or tissues known in the art. Next, a fluid impervious backsheet material is selected from a flexible second polymeric film. One or more layers of fluffed wood pulp are placed between the layers of the topsheet and backsheet materials. The perimeter edges of the topsheet and backsheet materials may then be secured to one another by standard means known in the art such that the layer of fluffed wood pulp is between a substantial portion of the topsheet and backsheet layers.

In order to provide a better understanding of the present invention, the following examples primarily illustrate certain more specific details thereof. In the following examples, the characteristics of the pulp were determined by the following tests:

Pre-poured Saturated Drainage (PSD) Test

In this test, a pulp is formed into an absorbent pad, saturated with liquid to form a pre-poured pad and the pad is drained to simulate a used diaper. Liquid is drained through this pre-poured pad with a Canadian Standard Freeness (CSF) test device as described in TAPPI - T 227 om-85, and the side volume drained from the device is used to measure the rate of liquid transport in the pad.

To conduct the test, a sheet of pulp to be tested is first shred in a Kamas mill into fluff using standard fluffing conditions. The fluff is air-dried and 12.0 grams (equivalent to 11.2 grams of oven-dried pulp) are weighed and mixed in about 600 mL of distilled or de-ionized water using a LIGHTNIN Mixer or a TAPPI/British Disintegrator for 10 seconds. The resulting volume should be less than 1000 mL.

All of the mixed fiber is then poured into the top chamber of the CSF test device and the water is drained and collected thereby forming a pad of the fibers. Free water is gently squeezed from the pad and collected until only a fine mist is being sprayed out (about 3 to 10 squeezes) using the rubber bulb on the top of the CSF tester. The water collected and squeezed from the pad is then poured onto the pad being careful not to disturb the pad by the flow of water. The water dripping through the pad is collected in the CSF chamber. This water is discarded and any excess water is then removed from the pad using the rubber bulb as before.

Next, 667 mL of clean water at room temperature (25° C.) is poured through the pad into the CSF chamber being careful not to disturb the pad. Water is drained from the CSF chamber while collecting and measuring the volume of water from the side opening of the CSF device. Excess water is again removed from the pad using the rubber bulb. The foregoing step is repeated until the 3 most recent volumes collected from the pad are within 10 mL of each other.

After completing the test, the bottom of the CSF chamber is closed and removed from its holder. The pad is gently removed from the chamber and placed flat on a blotter in order to dry completely. Drying the pad may take 1 to 2 nights. After drying, the height of the pad is measured and recorded.

Strike-through Acquisition Test

This test is used to simulate the absorption rate of a diaper containing several wettings and the tendency for the wet diaper to re-wet the baby. To obtain the strike-through acquisition weight and time, pulp is first shredded in a Kamas hammer-mill into fluff. An air-laid fluff pulp pad is made from 30 grams of the shredded pulp. A total of 9 pads each having a diameter of 5 inches may be made on a Demand-Wettability pad former or rectangular pads, 9 inches long by 4 inches wide can be made on an air-laid pad former. The pads made on the pad former are then weaved together in a line of 3 piles of 3 pads each with a 1 inch overlap. For pads made containing super-absorbing polymer (SAP), 10 grams of the SAP is sprinkled on the top of the bottom pad before covering the bottom pad with the other pads.

The constructed pad is then placed in the center of a 4 inch deep bowl having a 9 inch upper diameter and a 4 inch lower diameter. An amount of liquid equal to twice the pad weight is poured into the center of the pad and timing is begun. The time required to absorb all of the free liquid above the pad is recorded as the strike-through acquisition time. This procedure is repeated two times at 20 minute intervals to simulate second and third wettings.

After another 20 minute period, 5 grams of dry shredded fluff pulp are pressed onto the center of the pad by hand or by use of a blotter and an 8 pound weight. After 15 seconds, the blotting pulp is removed and weighed. The weight gained by the blotting pulp is recorded as the re-wet weight.

Finally, the pad is re-wet a fourth time using an amount of water equal to twice the initial pad weight plus the amount of water removed in the blotting step. The fourth strike-through acquisition time is the time reported in the examples.

EXAMPLE 3

Several samples of 133 oven dried grams of bleached kraft softwood where mixed with water to form slurries each weighing 392 grams and having consistencies of 33.9%. The fluffed wood pulp is produced according to the method detailed in Example 2 above. The reaction temperature was 74° C. and the slurry was treated for two minutes with a caustic solution prepared to provide a slurry consistency of 8%. Various concentrations of NaOH solutions were used. A pre-poured saturated drainage (PSD) test was performed on each sample. The PSD test is a measure of the liquid transport capability of fluff. A higher value indicates a higher transport capability. Summaries of the results are listed in Table 1.

TABLE 1

NaOH in Slurry (g/L)	H_2O added (grams)	Solid NaOH (grams)	PSD (mL)
0	1271	0	430
164	1055	216	480
199	1017	254	490
223	992	279	500
248	967	304	490
331	890	381	510
426	814	457	520

For caustic concentrations in the range of 164 to 426 grams per liter, there was dramatic increase in PSD volumes as compared to untreated fibers.

EXAMPLE 4

Several samples of 187.5 oven dried grams of bleached kraft softwood fibers were mixed into slurries weighing 553

grams and having consistencies of 33.9 wt. %. The fluffed wood pulp was produced generally in accordance with the method detailed above in Example 2. The reaction temperature was 23° C., and the reaction was conducted for two minutes in the presence of 1700 milliliters of white liquor, 1700 milliliters of Na_2S and water and 1700 milliliters of white liquor containing 100 grams of sodium sulfide. A PSD test was performed on each sample. Summaries of the results are listed in Table 2.

TABLE 2

White liquor (mL)	Na_2S*$9H_2O$ (grams)	H_2O (mL)	PSD (mL)
1700	0	0	500
1700	100	0	505
0	100	1700	385
0	0	1700	390

The white liquor treatments were effective in improving the liquid transport properties of the processed fibers.

EXAMPLE 5

Bleached kraft softwood pulp was processed generally in accordance with the method described above in Example 2 and various properties of the recovered fibers were compared against a sample of the virgin bleached kraft softwood fibers, a sample with 50 wt. % fluffed wood pulp and 50 wt. % virgin fibers and a sample containing 100 wt. % fluffed wood pulp. Summaries of the results are listed in Table 3. The Acquisition Tests were performed on pulp containing no super-absorbing polymer (SAP).

TABLE 3

Pulp Identification	Virgin Pulp	50 wt. % Blend	100 wt. % Treated
Scan Absorbency Test			
Absorbent time (sec.)	3.0	3.3	2.7
Capacity (g/g)	10.5	10.6	10.5
Specific Fluff vol. (cc/g)	20.6	20.5	18.5
Basket Sink Test			
Sink Time (sec.)	2.3	2.1	2.0
Absorptive capacity (g/g)	20.9	19.6	17.6
Demand Wettability Test			
Initial Absorbance (sec./10 mL)	28.0	28.0	26.0
Absorptive Capacity (g/g)	11.8	12.5	12.3
PSD Drainage Test (mL)	360.0	425.0	510.0
Acquisition Test no SAP			
4th wetting (sec.)	38.0	15.0	9.0
Re-wet weight (g)	38.0	34.0	37.0

The results indicate that even in a 50 wt. % blend, the fluffed wood pulp fibers are superior to the virgin kraft softwood fibers as shown by the PSD test.

In the foregoing example, the test procedures which were used are as follows:

Scan Absorbency Test

The scan absorbency test is based on the Scandinavian Pulp and Paper and Board Testing Committee Standards designated as SCAN-C33:80. In the procedure, fluffed pulp (3.0 grams) was used to form an absorbent pad in a fluff pad former and the pad was placed on an absorption and bulk tester (both of which instruments are available from Papir-industriens Forskningsinstitutt of Oslo, Norway). A 500 gram load was then placed on top of the pad and the plexiglas mold used to form the pad was removed. The screen on the base of the pad holder was pressed up against the pad to permit uniform wetting of the pad during scan testing.

After measuring and recording the pad caliper, the liquid reservoir of the tester was filled with 0.9 wt. % saline solution. The reservoir was then raised so that the base of the sample pad barely reached the reservoir. At the moment the test pad came into contact with the saline solution, the timer was started. When the saline solution had penetrated the sample pad, the timer was stopped and the absorption time in seconds was recorded.

Next, the sample pad was allowed to absorb liquid for an additional 30 seconds and the reservoir was then lowered so that the pad could drain for 30 seconds. Finally, the load was removed from the pad and the saturated sample pad was weighed. In order to calculate the specific fluff volume and absorptive capacity, the following equations were used:

$$\text{Specific volume } (cm^3/\text{grams}) = \text{caliper (cm)} \times 6.55$$

$$\text{Absorptive Capacity (gram/gram)} = \frac{\text{Total solution absorbed (g)}}{\text{3 grams of pulp}}$$

Demand Wettability Test

The Demand Wettability Test was adapted from the March 1974 INDA Technical Symposium paper entitled "Demand Wettability: A method for Measuring Absorbency Characteristics of Fabrics." In the test, a pulp fluff pad weighing 3 grams was formed and then pressed to a caliper of 0.135 inches using a hydraulic press such as a Carver Model C hydraulic press.

Next, the buret of a Demand Wettability tester (available from Scientific Machines & Company of Middlesex, N.J.) was filled with 0.9 wt. % saline solution and the tester was set on zero. The pressed pad was placed on the demand wettability tester, carefully centering the pad over the delivery orifice. A six inch diameter stainless steel plate and a weight, totalling 322 grams, was placed on top of the pad.

The demand flow was initiated by opening the stopcock on the buret. The time, in seconds, when each 5 milliliters of liquid was drawn from the buret was recorded until the flow through the pad stopped. The final buret reading was then recorded. A minimum of 3 pads per fluff sample were tested. The absorptive capacity was calculated by the following formula:

$$\text{Absorptive capacity (g.sol./g.pulp)} = \frac{\text{Total solution absorbed (g)}}{\text{3 grams of pulp}}$$

Basket Sink Test

In this test, a known weight of pulp fluff was allowed to sink in a saline solution. The fluff integrity was maintained by use of a wire basket and nonwoven tissue. In the test, 5 grams of pulp fluff were weighed and added evenly to a standard wire basket made from 22 gauge copper wire having a diameter of 5 centimeters, a length of 8 centimeters and containing wire rings spaced at 2 centimeter intervals. The basket weighed about 4 grams and was lined with tissue pieces each measuring 8 centimeters by 20 centimeters.

The basket was held horizontally above a 2-liter beaker containing 1400 milliliters of 0.9 wt. % saline solution. Next

the basket was evenly lowered until the basket touched the saline solution. When the basket was released into the beaker, the timer was started.

When the basket became completely submerged, the timer was stopped and the time was recorded. The basket was allowed to remain submerged for 15 seconds after stopping the timer.

Next the basket was removed from the saline solution and tilted at a 45° angle for 15 seconds in order to drain. The wet basket of pulp was placed in a tared container and weighed. After subtracting the weight of the fluff and basket, the weight was divided by 5 and reported as absorptive capacity in grams of saline solution per gram of pulp. Multiple samples of the same fluffed pulp were tested (3 to 5 samples).

EXAMPLE 6

Sample of 66.4 oven dry grams of unbleached pine pulps from Mobile, Ala., and unbleached hardwood pulps from Natchez, Miss. were prepared, and treated with a caustic solution at 8% consistency. Summaries of the results are listed in Table 4.

TABLE 4

Pulp #	Temp. (°C.)	NaOH Treatment (g/L)	PSD (mL)	Kappa	Brightness Reverted
Unbleached Pine					
1	23	0	290	32.6	—
2	40	148	470	29.5	14.3
3	40	170	475	29.8	13.9
4	23	265	495	—	—
Unbleached Hardwood					
5	23	0	0	15.3	—
6	37	145	255	9.4	27.3
7	39	175	265	9.4	25.4
Bleached Hardwood					
8	23	170	355	—	—

The improved properties of the NaOH treated unbleached pulps confirm the improved fluid transport properties of the fluffed wood pulp as compared to the untreated pulp. Furthermore, the absorbency and drainage advantages of the fluffed wood pulp persist upon bleaching as illustrated by Pulp #8. As can be seen, the treatment process may also have the advantage of removing lignin and reducing the kappa value of the unbleached pulps, with some brightness increase.

Thus, the personal hygiene articles of the present invention contain pulp processed with chemicals commonly found in the industry. Furthermore, the chemicals used to form the fluffed pulp may be easily removed by simple water washing. Another advantage of the invention is that the improved absorbency pulp may be made with inexpensive chemicals using relatively short reaction times. The resulting fluffed wood pulp may be used without additives as an absorbent sublayer or it may be combined with other super-absorbing compounds and fibers for increased absorbency.

Although this specification discloses particular embodiments of the invention, these examples merely describe illustrations of the invention. Those skilled in the art may recognize numerous rearrangements, modifications and substitutions of the inveation within the spirit and scope of the appended claims.

What is claimed is:

1. A method for making an absorbent composite useful for personal hygiene articles which comprises:

treating a wood fiber pulp containing wood fibers with a base at a temperature ranging from about 0° C. to about 80° C. thereby forming a treated wood fiber pulp containing wood fibers;

dry shredding the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;

providing at least one fluid permeable topsheet layer and at least one substantially fluid impermeable backsheet layer; and

interposing the sublayer material between the topsheet layer and backsheet layer.

2. The method of claim 1 wherein the sublayer material contains about 50% by weight of treated cellulosic fiber pulp and about 50% by weight unprocessed fibers.

3. The method of claim 1 wherein the sublayer material contains from about 10 to about 100% by weight of treated cellulosic fiber pulp and from about 0 to about 90% by weight of a super-absorbing polymer.

4. The method of claim 1 wherein the sublayer material is further characterized as having a strike-through acquisition re-wet weight of less than about 40 grams.

5. The method of claim 1 wherein the sublayer material has a pre-poured saturated drainage (PSD) capacity greater than about 400 mL.

6. The method of claim 1 further comprising connecting at least a portion of the topsheet layer to at least a portion of the backsheet layer so as to define a closed space between the layers containing the sublayer.

* * * * *

EXHIBIT B

Form PTO-850 [PROPOSED] U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

INTERFERENCE INITIAL MEMORANDUM

EXAMINER'S INSTRUCTIONS: This form need not be typewritten. Complete the items below and forward to the Group Clerk with all files including those the benefit of which has been accorded. The parties need not be listed in any specific order. Use a separate form for each count.

(See MPEP 2309.02)

BOARD OF PATENT APPEALS AND INTERFERENCES: An interference is found to exist between the following cases:

This is count 1 of 1 count(s)

1. NAME	SERIAL NO.	FILING DATE	PATENT NO., IF ANY
Leithem et al.	09/334,125	June 15, 1999	None
The claims of this party which correspond to this count are: Claims 61-62		The claims of this party which do not correspond to this count are: None	

*Accorded benefit of:

COUNTRY	SERIAL NO.	FILING DATE	PATENT NO., IF ANY
U.S.A.	08/370,571	January 18, 1995	None
U.S.A.	08/184,377	January 21, 1994	None

2. NAME	SERIAL NO.	FILING DATE	PATENT NO., IF ANY
Martin et al.	08/499,115	July 6, 1995	5,766,159
The claims of this party which correspond to this count are: Claims 1-6		The claims of this party which do not correspond to this count are: None	

*Accorded benefit of:

COUNTRY	SERIAL NO.	FILING DATE	PATENT NO., IF ANY
None			

If a claim of any party is exactly the same as this count, it should be circled above. If not, type the count in this space (attach additional sheet if necessary):

Claim 1 of the Martin '159 patent
OR
Claim 61 of the Leithem '125 application

Explanation of why each claim designated as corresponding to the count is directed to the same patentable invention as the count:

The count is a bifurcated count that includes as count alternatives the respective independent claims of the Martin '159 patent and the Leithem '125 application. The respective dependent claims correspond to the count because the additional limitations defined by those claims do not make them separately patentable.

*The serial number and filing date of each application the benefit of which is intended to be accorded must be listed. It is not sufficient to merely list the earliest application necessary for continuity.

DATE	PRIMARY EXAMINER	TELEPHONE No.	ART UNIT

NOTE: FORWARD ALL FILES INCLUDING THOSE BENEFIT OF WHICH IS BEING ACCORDED.	GROUP DIRECTOR SIGNATURE (if required)

Exhibit B to Request For Interference in 09/334,125

KL3:2116263.1

EXHIBIT C

[PROPOSED ATTACHMENT TO FORM PTO-850]

Proposed Count 1:

Claim 1 of the Martin '159 patent

OR

Claim 61 of the Leithem '125 patent.

Claim 1 of the Martin '159 patent reads as follows:

1. A method for making an absorbent composite useful for personal hygiene articles which comprises:

treating a wood fiber pulp containing wood fibers with a base at a temperature ranging from about 0° C. to about 80° C. thereby forming a treated wood fiber pulp containing wood fibers; dry shredding the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp; providing at least one fluid permeable topsheet layer and at least one substantially fluid impermeable backsheet layer; and interposing the sublayer material between the topsheet layer and backsheet layer.

Claim 61 of the Leithem '125 application reads as follows:

61. A method for making an absorbent composite useful for personal hygiene articles which comprises: treating a wood fiber pulp containing wood fibers with a base at a temperature ranging from 15° C. to about 60°C. thereby forming a treated wood fiber pulp containing wood fibers; fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp; providing at least one fluid permeable topsheet layer and at least one substantially fluid impermeable backsheet layer; and interposing the sublayer material between the topsheet layer and the backsheet layer.

EXHIBIT D

Comparison of Claim 1 of the Martin '159 Patent and Claim 61 of the Leithem Application

Claim 1 Martin '159 Patent	Claim 61 Leithem '125 Application
1. A method for making an absorbent composite useful for personal hygiene articles which comprises:	61. A method for making an absorbent composite useful for personal hygiene articles which comprises:
treating a wood fiber pulp containing wood fibers with a base	treating a wood fiber pulp containing wood fibers with a base
at a temperature ranging from about 0° C. to about 80° C.	at a temperature ranging from 15° C. to about 60°C.
thereby forming a treated wood fiber pulp containing wood fibers;	thereby forming a treated wood fiber pulp containing wood fibers;
dry shredding the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;	fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;
providing at least one fluid permeable topsheet layer	providing at least one fluid permeable topsheet layer
and at least one substantially fluid impermeable backsheet layer;	and at least one substantially fluid impermeable backsheet layer;
and interposing the sublayer material between the topsheet layer and backsheet layer.	and interposing the sublayer material between the topsheet layer and the backsheet layer.

Applicants note that where claim 1 of the Martin '159 patent defines the step of "dry shredding" the treated wood fiber pulp, claim 61 of the Leithem '125 application defines the step of "fluffing" the treated wood fiber pulp. This is not a patentable distinction. As stated by the inventors during the prosecution of the Martin '159 patent, "one skilled in the art of pulp processing would recognize the phrase 'fluffed pulp' to mean a product consisting of unbonded wood pulp fibers which is produced by dry shredding wood pulp in either web or sheet form." Martin '159 patent, July 16, 1997 Amendment Under 37 §1.116, p. 3. A copy of this amendment is attached as "Exhibit E".

EXHIBIT E

BOX AF

PATENT
Docket No. 48092.00/3520.0

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Bruce D. MARTIN et al.
Serial No.:	08/499,115
Filed:	July 6, 1995
For:	PERSONAL HYGIENE ARTICLES FOR ABSORBING FLUIDS
Examiner:	Ki-O
Group Art Unit:	3308

BOX AF
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

AMENDMENT UNDER 37 §1.116 **EXPEDITED PROCEDURE**

In response to the Final Office Action dated May 13, 1997, it is requested that the following amendment and response be entered and considered:

In The Claims:

Cancel Claims 1-16 in their entirety without prejudice or disclaimer.

Claim 23 (amended twice) A method for making an absorbent composite useful for personal hygiene articles which comprises:

treating a [cellulosic] wood fiber pulp with a base at a temperature ranging from about 0° to about 80°C thereby forming a treated [cellulosic] wood fiber pulp;

fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;

providing at least one fluid permeable topsheet layer and at least one substantially fluid impermeable backsheet layer; and

interposing the sublayer material between the topsheet layer and backsheet layer.

REMARKS

Claims 1-16 and 28 are in the case. Claims 1-16 directed to a personal hygiene article are canceled without prejudice in light of the finality of the restriction requirement. Claim 23 is amended to more clearly and distinctly claim the invention. Support for the amendment to Claim 23 can be found in the Specification on page 3, lines 18-20. Thus the claims remaining in the Case are 23-28. No new matter is entered into the case by the above amendment.

Claims 23, 25 and 28 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent 4,104,214 to Meierhoefer in view of U.S. Patent 5,091,240 to Kajander et al. Claims 24, 26 and 2 were rejected under 35 U.S.C. §103 as being unpatentable over the '214 patent in view of the '240 to Kajander et al. and further in view of U.S. Patent 3,670,731 to Harmon. Applicants acknowledge and appreciate the Examiner's withdrawal of the rejection of Claims 17-22 under 35 U.S.C. §112, second paragraph made in the previous office action.

The rejections are respectfully traversed. Reconsideration and withdrawal of the same are requested in light of the foregoing amendments and the following remarks. As described in more detail below, the cited art fails to suggest treatment of the fibers of a cellulosic pulp with a base in order to form fluffed wood pulp having improved fluid transport properties and incorporation of the fluffed pulp into a personal hygiene article. Fluffing base-treated wood pulp significantly curtails fiber clumping, which has limited the rewettability and liquid transport properties of prior absorbent products containing wood pulp.

A. The Claims Patentably Distinguish Over the Art of Record.

The claimed invention relates to a method for making personal hygiene articles which exhibit the ability to reduce the incidence of clumping and binding after repeated wetting and compression of the layer containing the fibers. In the process, wood fiber pulp is treated with a base at a temperature within the range of from about 0° to about 80°C thereby forming a base-treated wood fiber pulp. The treated pulp is then fluffed to form a fluffed wood pulp consisting of a fibrous mass which is used as a sublayer material. The sublayer is interposed between a topsheet layer formed of

flexible, fluid permeable material and a backsheet layer formed from a substantially fluid-impervious material.

The sublayer material is comprised of one or more layers of fluffed and treated wood fiber pulp which may or may not be separated by tissue or nonwoven materials. Hence, the sublayer material may contain from 10 to about 100 wt.% of fluffed and treated wood fiber pulp and, optionally, unprocessed fiber and/or super-absorbing polymers.

Unlike many of the presently available products, the personal hygiene articles of the invention are capable of maintaining excellent fluid transport properties and fluid retention characteristics even after repeated wetting and absorbing episodes. This is due, at least in part, to the decreased tendency of the fluffed base-treated wood pulp to bind or clump together upon wetting and drying, even if the fibers are compressed.

The sublayer material does not need to be superabsorbent to be effective as a sublayer in a personal hygiene composite. It is only necessary for the sublayer to quickly transport fluid away from the permeable layer, even when already wet. Conventional absorbent articles contain superabsorbent polymers which provide for long term storage of fluids. Despite their absorption capacity, fluids are not quickly transported to the superabsorbent layers of such composites. Applicants' invention improves the fluid transport properties of absorbent products by providing composites containing treated and fluffed wood fiber pulp as a sublayer material which exhibits reduced clumping or matting upon being wetted, maintaining a more open network for enhanced fluid transport during repeated rewetting cycles.

As an initial matter, it is noted that the Examiner referred to a Webster dictionary definition of "fluff". While the definition may be appropriate for the general public, one skilled in the art of pulp processing would recognize the phrase "fluffed pulp" to mean a product consisting of unbonded wood pulp fibers which is produced by dry shredding wood pulp in either web or sheet form. (See Paper Vocabulary, SIS Handbook 146, published by SIS of Stockholm, Sweden, 1980, p. 137, enclosed as Exhibit A). Accordingly, the "fluffed pulp" referred to in the claims is the result of a shredding process conducted on the pulp, not the mere "shaking or patting process"

imagined by the examiner to be occurring in the Meierhoefer viscose process. Applicants' claimed process involving fluffing gives the base-treated wood pulp unique transport properties which are not found in conventional absorbent materials. Accordingly, when considering the process of the claimed invention, it is appropriate to employ the meanings of the terminology as understood by those skilled in the art in order to correctly assess the patentability of the claimed invention. It is believed that when the correct definition for fluffed pulp is used, it will be apparent to the examiner that none of the cited references suggest or describe the claimed invention alone or in any combination thereof.

Turning now to the rejections, the '214 patent describes formation of viscose rayon fibers which requires the formation of an alkali cellulose and the reaction of the alkali cellulose with carbon disulfide to form "soluble sodium xanthate." The xanthated cellulose is dissolved in dilute aqueous sodium hydroxide to form "viscose" which is spun into yarn by extruding the solution through a spinneret.

It is clear from the description of the '214 patent that it is the extruded viscose solution-derived fibers that are being made into an absorbent product, not base-treated and fluffed wood pulp fibers. Applicants' claims specifically call for "fluffing" a base-treated fiber pulp and cannot reasonably be said to be suggested by the '214 patent which teaches dissolving the pulp, leaving nothing to be fluffed! The person of ordinary skill plainly would not find it obvious from the '214 patent to fluff a base-treated wood pulp because the alkali pulp in the '214 patent is dissolved and converted into something else.

The deficiencies of the '214 patent are not cured by the description in the '240 patent. The '240 patent describes a lamination process for incorporating a fibrous layer into a disposable absorbent product. In the '240 patent, the fibers are impregnated with a water-based adhesive to provide adhesive-impregnated layers containing fiber-to-fiber bonds and a hot melt adhesive is then applied to join the adhesive-impregnated layers together. The '240 patent fails to direct one skilled in the art to treat wood fiber pulp with a base and then fluff the treated pulp to form an absorbent sublayer.

Accordingly, even if the rayon fibers from the xanthated solution of the '214 patent were used in the laminated product described in the '240 patent, the product would not inherently possess the properties of Applicants' product since the fibers would not be fluffed base-treated wood fibers according to the method of the claimed invention. Applicants' claimed process requires that the pulp be treated with a base at a temperature ranging from about 0° to about 80°C and that the treated pulp be fluffed. Because these steps are missing from the combination of references, it is plainly erroneous for the Examiner to maintain the rejection of Claims 23, 25 and 28 based on these references.

For the foregoing reasons, it is also error for the Examiner to maintain the rejection of Claims 24, 26 and 27 over the '214 patent in view of the '240 patent and further in view of the '731 patent. The '731 patent relied upon by the Examiner fails to suggest critical steps of the claimed method, namely, base-treating a wood fiber pulp and then fluffing the base-treated wood pulp for production of an absorbent layer. The mere reference in the '731 patent to use of fluffed pulp cannot reasonably be said to suggest use of "base-treated" fluffed pulp.

Applicants do not claim to have invented fluffed wood pulp, and are not attempting to cover all absorbent products containing fluffed wood pulp. What Applicants do claim as a novel and nonobvious process is production of absorbent products containing base-treated fluffed wood fibers which are shown without question in the specification to exhibit dramatically better PSD as compared to untreated fluffed fibers (see Stables 1 and 2). This is not obvious or suggested by the cited combination of references, and there is no valid basis in law to impose any burden on Applicants to demonstrate further the already manifest nonobvious differences between the claimed product and that described in the '731 patent. Tables 1 and 2 of the present specification already show that a mere "fluffed pulp" as mentioned in the '731 patent is vastly inferior in absorbency properties to Applicants' claimed fluffed base-treated wood pulp.

In summary, each patent cited by the Examiner describes absorbent articles made in different ways, however, the references alone or in combination do not suggest Applicants' claimed invention which improves the fluid transport properties of

absorbent composites through use of a base-treated wood fiber fluff as a sublayer. The claims as amended patentably distinguish over the art of record, and should therefore be allowed.

Respectfully submitted,

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on July 14, 1997
Date

David E. LaRose
David E. LaRose

EXHIBIT F

Claims 61 and 62 of the Leithem '125 Application

Claim 61 of the Leithem '125 application reads as follows:

61. A method for making an absorbent composite useful for personal hygiene articles which comprises: treating a wood fiber pulp containing wood fibers with a base at a temperature ranging from 15° C. to about 60°C. thereby forming a treated wood fiber pulp containing wood fibers; fluffing the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp; providing at least one fluid permeable topsheet layer and at least one substantially fluid impermeable backsheet layer; and interposing the sublayer material between the topsheet layer and the backsheet layer.

Claim 62 of the Leithem '125 application reads as follows:

62. The method of claim 61 wherein the sublayer material contains from about 25 to about 100% by weight of treated cellulosic fiber pulp and from about 0 to about 75% by weight of unprocessed fibers.

EXHIBIT G

Comparison of Claim 1 of the Martin '159 Patent and
Claim 61 of the Leithem '125 Application As Added On June 15, 1999

Claim 1 Martin '159 Patent	Claim 61 Leithem '125 Application As Added On June 15, 1999
1. A method for making an absorbent composite useful for personal hygiene articles which comprises:	61. A method for making an absorbent composite useful for personal hygiene articles which comprises:
treating a wood fiber pulp containing wood fibers with a base	treating a wood fiber pulp containing wood fibers with a base
at a temperature ranging from about 0° C. to about 80° C.	at a temperature ranging from 15° C. to about 60°C.
thereby forming a treated wood fiber pulp containing wood fibers;	thereby forming a treated wood fiber pulp containing wood fibers;
dry shredding the treated wood fiber pulp to form an absorbent sublayer material comprised of fluffed base-treated wood pulp;	dry shredding the treated wood fiber pulp to form an absorbent sublayer material comprised of shredded base-treated wood pulp;
providing at least one fluid permeable topsheet layer	providing at least one fluid permeable topsheet layer
and at least one substantially fluid impermeable backsheet layer;	and at least one substantially fluid impermeable backsheet layer;
and interposing the sublayer material between the topsheet layer and backsheet layer.	and interposing the sublayer material between the topsheet layer and the backsheet layer.